

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/24148

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F28D 7/10

US CL : 165/46, 164, 906; 138/172

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 165/154, 177, 183

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,330,491 A (DOSHI et al) 18 May 1982 (18.05.1982), see Figure 2.	17-20,22
X	US 4,410,012 A (REDDING et al) 18 October 1983 (18.10.1983), see Figure 2.	17,20,22
X	US 5,176,180 A (WILLIAMS et al) 05 January 1993 (05.01.1993), see Figure 1.	17-20, 22
A	US 2,611,585 A (BOLING) 23 September 1952 (23.09.1952). see all figures.	1-33
A	US 3,739,842 A (WHALEN) 19 June 1973 (19.06.1973), see all figures.	
A	US 4,316,502 A (SANBORN et al) 23 February 1982 (23.02.1982), see all figures.	
A	US 4,411,307 A (ECKER) 25 October 1983 (25.10.1983), see all figures.	
A	US 6,595,241 B2 (CHEN) 22 July 2003 (22.07.2003), see all figures.	
A	US 2,707,095 A (PARSONS et al) 26 April 1955 (26.04.1955), see all figures.	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"B" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

01 February 2005 (01.02.2005)

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2,773,513 A (ISENBERG) 11 December 1956 (11.12.1956), see all figures.	
A	US 3,498,071 A (TREMONT) 03 March 1970 (03.03.1970), see all figures.	
A	US 3,782,452 A (CEPLON) 01 January 1974 (01.01.1974), see all figures.	
A	US 3,904,394 A (PRAST et al) 09 September 1975 (09.09.1975), see all figures.	